

## Scope of the Claims

[1] A beam current sensor comprising a super-conductive body, which is a cylindrical body where a beam passes through an inner diameter side and a bridge unit is formed on an outer diameter side, wherein

    said bridge unit is formed in a coil shape.

[2] A beam current sensor comprising a super-conductive body, which is a cylindrical body where a beam passes through an inner diameter side and a bridge unit is formed on an outer diameter side, wherein

    said bridge unit comprising:

        a first coil unit formed so as to have a spiral shape wound counterclockwise from the outer diameter side toward the inner diameter side;

        a second coil unit formed so as to have a spiral shape wound clockwise from the outer diameter side toward the inner diameter side; and

        a connection portion for connecting the center position of the inner diameter side of said first coil unit with the center position of the inner diameter side of said second coil unit.

[3] A beam current sensor comprising a super-conductive body, which is a cylindrical body where a beam passes through an inner diameter side and a bridge unit to which a SQUID input coil is adjacently arranged is formed on an outer diameter side,

comprising:

    a soft magnetic body arranged near said bridge unit,  
    wherein

    said SQUID input coil is arranged between said bridge unit  
    and said soft magnetic body.

[4] A beam current sensor comprising a super-conductive body, which is a cylindrical body where a beam passes through an inner diameter side and a bridge unit to which a SQUID input coil is adjacently arranged is formed on an outer diameter side, wherein

    said bridge unit comprising:

    a first coil unit formed so as to have a spiral shape wound counterclockwise from the outer diameter side toward the inner diameter side;

    a second coil unit formed so as to have a spiral shape wound clockwise from the outer diameter side toward the inner diameter side; and

    a connection portion for connecting the center position of the inner diameter side of said first coil unit with the center position of the inner diameter side of said second coil unit,

    said beam current sensor includes:

    a first soft magnetic body of an approximately rectangular parallelepiped shape arranged on said first coil unit;

    a second soft magnetic body of an approximately rectangular parallelepiped shape arranged on said second coil unit; and

a third soft magnetic body including an approximately U-shape, where one end portion is arranged on said first soft magnetic body side and the other end portion is arranged on said second soft magnetic body side, and which bridges said first soft magnetic body and said second soft magnetic body, and

said SQUID input coil is arranged between said first soft magnetic body and said one end portion of said third soft magnetic body and between said second soft magnetic body and said other end portion of said third soft magnetic body.

[5] A beam current sensor comprising a super-conductive body, which is a cylindrical body where a beam passes through an inner diameter side and a bridge unit to which a SQUID input coil is adjacently arranged is formed on an outer diameter side, comprising:

a soft magnetic body forming a magnetic closed loop surrounding said bridge unit, and

said SQUID input coil is arranged between said bridge unit and said soft magnetic body.

[6] A beam current sensor comprising a super-conductive body, which is a cylindrical body where a beam passes through an inner diameter side and a bridge unit to which a SQUID input coil is adjacently arranged is formed on an outer diameter side, wherein

said bridge unit is bridged so as to pass over an insulator by forming a gap against said insulator and formed in a standing

manner,

    said beam current sensor includes a soft magnetic body that forms a magnetic closed loop by inserting a part thereof into said gap, and

    said SQUID input coil is arranged near said bridge unit and said soft magnetic body.